

CLAIMS

1. A packaging structure for supporting a segment of optical fiber having a grated section, said packaging structure comprising:
 - a housing having a housing body defining a housing body outer surface, a housing body first end and a housing body second end, said housing body having a housing channel extending therethrough for receiving said grated section therein, said housing channel defining a housing channel longitudinal axis;
 - a first component and a second component both mounted on said housing body respectively adjacent said housing body first and second ends, said first and second components respectively defining first and second component-to-fiber attachment sections both freely engaging said housing channel in opposite directions for securing said fiber in a tensioned state therebetween;
 - said first component being movably coupled to said housing body for allowing said first component-to-fiber attachment section to selectively slide axially within said housing channel;
 - said housing body being provided with at least one access window formed therein and extending substantially transversally from said housing body outer surface to said housing channel, said access window being positioned, configured and sized so as to be substantially in register with at least a portion of a selected one of said first or second component-to-fiber attachment sections for allowing physical access thereto;
 - said housing being made of a housing material having a housing coefficient of thermal expansion, said first component being made out of a first component material having a first component coefficient of thermal expansion, said housing, first and second component coefficients of thermal expansion being selected so as to compensate for the thermal dependency of said grated section

2. A packaging structure as recited in claim 1 wherein said first component is movably coupled to said housing body so as to allow said first component-to-fiber attachment section to translate within a predetermined translational range inside said housing channel; said access window being positioned, configured and sized so as to allow physical access to said first component-to-fiber attachment section throughout the translational range of the latter.

3. A packaging structure as recited in claim 2 wherein said housing body is provided with a first access window and a second access window formed therein, both said first and second access windows extending substantially transversally from said housing body outer surface to said housing channel, said first access window being positioned, configured and sized so as to be substantially in register with at least a portion of said first component-to-fiber attachment section for allowing physical access thereto and said second access window being positioned, configured and sized so as to be substantially in register with at least a portion of said second component-to-fiber attachment section for allowing physical access thereto.

4. A packaging structure as recited in claim 1 wherein said first component is movably coupled to said housing body by a treaded link extending therebetween.

5. A packaging structure as recited in claim 4 wherein said housing body has a substantially elongated and tubular housing peripheral wall, said housing peripheral wall defining a housing inner surface, said housing inner surface being provided with a housing thread for threadably engaging said first component.

6. A packaging structure as recited in claim 1 wherein said first component-to-fiber attachment section is provided with attachment facilitating means formed thereon for facilitating attachment thereto of said fiber at a predetermined location.
7. A packaging structure as recited in claim 1 wherein said first component-to-fiber attachment section is provided with attachment facilitating means formed thereon for facilitating attachment thereto of said fiber at predetermined and incrementally spaced locations therealong.
8. A packaging structure as recited in claim 6 wherein said fiber is attached to said first component-to-fiber attachment section by a first component-to fiber layer of adhesive material extending therebetween, said attachment facilitating means including a quantity calibrating means for calibrating the quantity of adhesive material used for forming said first component-to fiber layer of adhesive material during attachment of said fiber to said first component-to-fiber attachment section.
9. A packaging structure as recited in claim 6 wherein said fiber is attached to said first component-to-fiber attachment section by a first component-to fiber layer of adhesive material extending therebetween, said first component-to fiber layer of adhesive material being positioned between said fiber and said first component-to-fiber attachment section using an adhesive dispensing implement during manufacturing of said packaging structure, said attachment facilitating means including an implement guiding means for guiding said adhesive dispensing implement during use thereof for dispensing said first component-to fiber layer of adhesive material between said fiber and said first component-to-fiber attachment section.

10. A packaging structure as recited in claim 1 wherein said first component-to-fiber attachment section has a generally elongated and tubular configuration, said first component-to-fiber attachment section defining a first component-to-fiber attachment section outer surface, said first component-to-fiber attachment section outer surface being provided with a first channel formed therein and extending longitudinally therealong for receiving a section of said fiber, said first channel defining a first axis, said first axis being in a generally collinear relationship relative to said housing body longitudinal axis when said first component is mounted on said housing body.

11. A packaging structure as recited in claim 10 wherein said first channel has a substantially "U"-shaped cross-sectional configuration defining a first channel base wall and a pair of first channel side walls extending from said first channel base wall in a substantially opposed relationship relative to each other, said fiber being attached to said first component-to-fiber attachment section by a first component-to fiber layer of adhesive material extending therebetween; said first component-to fiber layer of adhesive material circumferentially surrounding a longitudinal segment of said fiber and being in contact with a corresponding longitudinal segment of said first channel base wall and side walls, said first channel being configured and sized so as to substantially fittingly receive said fiber surrounded by said first component-to fiber layer of adhesive material for preventing lateral deflection of said fiber within said first channel.

12. A packaging structure as recited in claim 10 wherein said first component defines a first component outer surface, said first channel having a substantially "U"-shaped cross-sectional configuration defining a first channel base wall and a pair of first channel side walls

extending from said first channel base wall in a substantially opposed relationship relative to each other, at least one of said first channel side walls having an anchoring portion, said side wall about said anchoring portion defining a side wall attachment section extending from said first channel base wall and a side wall guiding section extending from said first component outer surface to said side wall attachment section, said side wall guiding section being recessed inwardly towards said first component outer surface relative to said side wall attachment section so that the width of said first channel about said side wall guiding section is greater than the width of said first channel about said side wall attachment section, said side wall attachment and guiding sections defining an abutment shoulder extending substantially perpendicularly therebetween.

13. A packaging structure as recited in claim 12 wherein said fiber is attached to said first component-to-fiber attachment section by a first component-to fiber layer of adhesive material extending therebetween, said first component-to fiber layer of adhesive material being positioned between said fiber and said first component-to-fiber attachment section using an adhesive dispensing implement during manufacturing of said packaging structure, said side wall attachment section being configured and sized for abuttingly guiding said adhesive dispensing implement during use thereof for dispensing said first component-to fiber layer of adhesive material between said fiber and said first component-to-fiber attachment section.

14. A packaging structure as recited in claim 13 wherein said abutment shoulder is configured and sized so as to abuttingly limit the insertion of said adhesive dispensing implement in said first channel about said anchoring portion.

15. A packaging structure as recited in claim 10 wherein said first component defines a first component outer surface, said first channel having a substantially "U"-shaped cross-sectional configuration defining a first channel base wall and a pair of first channel side walls extending from said first channel base wall in a substantially opposed relationship relative to each other, at least one of said first channel side walls having at least two anchoring portions positioned in an incrementally and predetermined spaced relationship relative to each other along said at least one of said first channel side walls, said side wall about each of said anchoring portions defining a side wall attachment section extending from said first channel base wall and a side wall guiding section extending from said first component outer surface to said side wall attachment section, said side wall guiding section being recessed inwardly towards said first component outer surface relative to said side wall attachment section so that the width of said first channel about said side wall guiding section is greater than the width of said first channel about said side wall attachment section, each of said side wall attachment and guiding sections defining a corresponding abutment shoulder extending substantially perpendicularly therebetween.

16. A packaging structure as recited in claim 15 wherein at least one of said side wall guiding sections has a substantially arcuately concave configuration.

17. A packaging structure as recited in claim 1 wherein said first component further defines a first component-to-housing mounting section for movably mounting said first component to said tube, said first component-to-housing mounting section extending integrally from said first component-to-fiber attachment section, said first component-to-housing mounting section being provided with first component threads formed thereon for threadably engaging said housing channel, said first component-to-fiber attachment section and said first

component-to-housing mounting section being provided with a common first channel formed therein and extending longitudinally therealong for receiving a section of said fiber, said first channel defining a first axis, said first axis being in a generally collinear relationship relative to said housing body longitudinal axis when said first component is mounted on said housing body.

18. A packaging structure as recited in claim 17 wherein said first component further defines a first component grasping section extending from said first component-to-housing mounting section opposite said first component-to-fiber attachment section, said first component-to-fiber attachment section, said first component-to-housing mounting section and said first component grasping section being provided with a common first channel formed therein and extending longitudinally therealong for receiving a section of said fiber, said first channel defining a first axis, said first axis being in a generally collinear relationship relative to said housing longitudinal axis when said first component is mounted on said housing body.

19. A packaging structure as recited in claim 18 wherein said first component has a generally cylindrical configuration and defines a first component outer surface, the diameter of said first component grasping section being greater than that of the remainder of said first component-to-housing mounting section do as to define a first component mounting-to-grasping section shoulder between said first component-to-housing mounting section and said first component grasping section, said first component mounting-to-grasping section shoulder extending in a substantially perpendicular relationship relative to said first component outer surface; said housing peripheral wall defining a housing flange section adjacent said housing first end, said housing flange section having a smaller wall thickness

then the that of the remainder of said housing peripheral wall, said housing flange section defining a housing first shoulder extending generally perpendicularly towards said remainder of said housing peripheral wall, said first component mounting-to-grasping section shoulder and said housing first shoulder being spaced relative to each other when said first component is mounted on said housing body so as to define a generally annular first component-to-housing recess therebetween.

20. A packaging structure as recited in claim 19 wherein said first mounting-to-grasping recess is at least partially filled with a first component-to-housing layer of adhesive material for adhesively securing said first component to said housing.

21. A packaging structure as recited in claim 18 wherein said first component defines a first component outer surface, said first component grasping section being provided with a first grasping section aperture extending substantially transversally from said housing body outer surface to said housing channel.

22. An optical fiber packaging structure for athermally and adjustably supporting a segment of optical fiber, said fiber defining a fiber longitudinal axis, a fiber first end and a fiber second end, said fiber being provided with an optical component optically coupled thereto between said fiber first and second ends for modifying the optical characteristics of an optical signal traveling therethrough, the modification of the optical characteristics of said optical signal imputable to said optical component being at least in part dependant on the temperature and strain conditions imparted on said optical component, said packaging structure comprising:

- a housing having a generally hollow housing body, said housing body defining a housing body first end and a substantially opposed housing body second end;
- a first component movably mounted on said housing substantially adjacent said housing body first end, said first component being provided with a first channel extending therethrough for receiving a portion of said fiber, said first channel defining a first channel axis, said first component being selectively movable for displacement relative to said housing in a direction substantially parallel to said first channel axis,
- said first component defining a first component attachment location for allowing attachment thereto of said fiber substantially adjacent said fiber first end, said housing defining a housing attachment location for allowing attachment relative thereto of said fiber substantially adjacent said fiber second end;
- a fiber-to-first component attachment means extending between said fiber and said first component for attaching said fiber to said first component attachment location;
- a fiber-to-housing attachment means extending between said fiber and said housing for attaching said fiber to said housing attachment location;
- said first component and housing attachment locations being spaced relative to each other in a direction generally parallel to said fiber axis by an adjustable location spacing;
- a location spacing first adjustment means for allowing adjustment of the length of said location spacing by allowing adjustment of the position of either one of said first component or housing attachment locations respectively on said first component and housing;
- a location spacing second adjustment means extending between said first component and said housing for allowing adjustment of the length of said location spacing by adjusting the positional relationship between said first component and said housing;
- said housing being made of a housing material having a housing coefficient of thermal expansion, said first component being made out of a first component material, said housing

and first component coefficients of thermal expansion being selected so as to compensate for the dependency of said optical characteristics of said optical signal imputable to said optical component.

23. A packaging structure as recited in claim 22 wherein said location spacing first adjustment means allows adjustment of the length of said location spacing by allowing adjustment of both said first component and housing attachment locations respectively on said first component and housing.

24. A packaging structure as recited in claim 22 wherein said housing includes a second component mounted on said housing substantially adjacent said housing body second end, said fiber-to-housing attachment means including a fiber-to-second component attachment means extending between said fiber and said second component for attaching said fiber to said second component substantially adjacent said fiber second end.

25. A packaging structure as recited in claim 24 wherein said location spacing first adjustment means allows for adjustment of the length of said location spacing by allowing adjustment of the position of said housing attachment location on said second component.

26. A packaging structure as recited in claim 22 wherein

- said housing body includes a generally elongated tube;
- said first component defines a first component-to-tube mounting section for mounting said first component to said tube and a generally elongated first component-to-fiber attachment section positioned within said tube for allowing attachment thereto of said fiber adjacent said fiber first end;

- said location spacing first adjustment means including first access means formed in said tube for allowing access to said first component-to-fiber attachment section so as to allow said first component attachment location to be positioned at various locations along said first component-to-fiber attachment section.

27. A packaging structure as recited in claim 22 wherein said first access means includes a first access aperture formed in said tube generally in register with said first component-to-fiber attachment section.

28. A packaging structure as recited in claim 22 wherein

- said housing body includes a generally elongated tube;
- said housing includes a second component mounted on said housing substantially adjacent said housing body second end, said fiber-to-housing attachment means including a fiber-to-second component attachment means extending between said fiber and said second component for attaching said fiber to said second component substantially adjacent said fiber second end;
- said location spacing first adjustment means allows for adjustment of the length of said location spacing by allowing adjustment of the position of said housing attachment location on said second component;
- said second component defines a second component-to-tube mounting section for mounting said second component to said tube and a generally elongated second component-to-fiber attachment section positioned within said tube for allowing attachment thereto of said fiber adjacent said fiber second end;
- said location spacing first adjustment means including second access means formed in said tube for allowing access to said second component-to-fiber attachment section so as to allow

said second component attachment location to be positioned at various locations along said second component-to-fiber attachment section.

29. A packaging structure as recited in claim 28 wherein said second access means includes a second access aperture formed in said tube generally in register with said second component-to-fiber attachment section.

30. A packaging structure as recited in claim 22 wherein

- said housing body includes a generally elongated tube;
- said first component defines a first component-to-tube mounting section for mounting said first component to said tube and a generally elongated first component-to-fiber attachment section positioned within said tube for allowing attachment thereto of said fiber adjacent said fiber first end;
- said location spacing first adjustment means including first access means formed in said tube for allowing access to said first component-to-fiber attachment section so as to allow said first component attachment location to be positioned at various locations along said first component-to-fiber attachment section;
- said first access means includes a first access aperture formed in said tube generally in register with said first component-to-fiber attachment section;
- said housing includes a second component mounted on said housing substantially adjacent said housing body second end, said fiber-to-housing attachment means including a fiber-to-second component attachment means extending between said fiber and said second component for attaching said fiber to said second component substantially adjacent said fiber second end;

- said location spacing first adjustment means allows for adjustment of the length of said location spacing by allowing adjustment of the position of said housing attachment location on said second component;
- said second component defines a second component-to-tube mounting section for mounting said second component to said tube and a generally elongated second component-to-fiber attachment section positioned within said tube for allowing attachment thereto of said fiber adjacent said fiber second end;
- said location spacing first adjustment means including second access means formed in said tube for allowing access to said second component-to-fiber attachment section so as to allow said second component attachment location to be positioned at various locations along said second component-to-fiber attachment section;
- said second access means includes a second access aperture formed in said tube generally in register with said second component-to-fiber attachment section.

31. A packaging structure as recited in claim 30 wherein

- said fiber-to-first component attachment means includes a first layer of adhesive material extending between said fiber and said first component attachment section about said first component attachment location;
- said fiber-to-housing attachment means includes a second layer of adhesive material extending between said fiber and said second component attachment section about said housing attachment location.

32. A packaging structure as recited in claim 30 wherein said location spacing second adjustment means includes a threaded link between said first component and said housing,

said threaded link allowing adjustment of the positional relationship between said first component and said housing.

33. A packaging structure for supporting a segment of optical fiber, said fiber being provided with a Bragg filter optically coupled thereto; said Bragg filter defining a temperature dependent Bragg wavelength and a rate of wavelength drift per temperature change; said optical fiber being attachable about a fiber first attachment point and a fiber second attachment point to said packaging structure; said packaging structure comprising:

- a housing having a generally tubular housing body;
- a fiber-to-housing attachment means for attaching said fiber to said housing so that said Bragg filter is positioned within said housing body;
- a Bragg wavelength adjustment means for allowing adjustment of said Bragg wavelength without modifying said rate of wavelength drift per temperature change ;
- a wavelength excursion adjustment means for allowing adjustment of said rate of wavelength drift per temperature change without modifying said Bragg wavelength.

34. A packaging structure for supporting a segment of optical fiber, said fiber defining a fiber longitudinal axis, a fiber first end and an opposed fiber second end, said fiber being provided with an optical component optically coupled thereto between said fiber first and second ends for modifying the optical characteristics of an optical signal traveling therethrough, the modification of the optical characteristics of said optical signal imputable to said optical component being at least in part dependant on the temperature and strain conditions imparted on said optical component, said optical fiber being attachable about a fiber first attachment point and a fiber second attachment point to said packaging structure, said fiber first and second fiber points being positionable respectively between said fiber first end and

said optical component and between said fiber second end and said optical component; said packaging structure comprising:

- a housing having a generally hollow housing body, said housing body defining a housing body first end and a substantially opposed housing body second end;
- a first component mounted on said housing substantially adjacent said housing body first end, said first component being provided with a first channel extending therethrough for receiving a portion of said fiber, said first channel defining a first channel axis, said first channel axis being in a generally collinear relationship relative to said fiber longitudinal axis,
- a fiber-to-first component attachment means extending between said fiber and said first component for attaching said fiber first attachment point to said first component;
- a fiber-to-housing attachment means extending between said fiber and said housing for attaching said fiber second attachment point to said housing;
- said fiber first and second attachment points being spaced relative to each other in a direction generally parallel to said fiber longitudinal axis by an adjustable fiber point spacing;
- a per-attachment customization means associated with said structure for allowing customization of the length of said fiber point spacing during attachment of said fiber first and second attachment points respectively to said first component and said housing;
- a post-attachment customization means associated with said structure for allowing customization of the length of said fiber point spacing after attachment of said fiber first and second attachment points respectively to said first component and said housing;
- said housing being made of a housing material having a housing coefficient of thermal expansion, said first component being made out of a first component material, said housing and first component coefficients of thermal expansion being selected so as to compensate for the dependency of said optical characteristics of said optical signal imputable to said optical component.

35. A packaging structure as recited in claim 34 wherein said first component is movably mounted on said housing body for axial movement relative thereto, said post-attachment customization means including a first component moving means for selectively moving said first component in direction substantially parallel to said first channel axis.

36. A packaging structure as recited in claim 35 wherein said first component moving means includes a threaded link formed between said housing body and said first component.

37. A packaging structure as recited in claim 36 wherein

- said housing body has a generally elongated and tubular configuration, said housing body defining a housing inner surface, said housing inner surface being provided with a housing thread adjacent said housing body first end;
- said first component defines a first component-to-housing mounting section for mounting said first component to said tube and a generally elongated first component-to-fiber attachment section positionable within said housing for allowing attachment thereto of said fiber about said fiber first attachment point, said first component-to-housing mounting section having a generally cylindrical configuration and being provided with a first component external thread for threadably engaging said housing thread.

38. A packaging structure for supporting a segment of optical fiber, said fiber defining a fiber longitudinal axis, a fiber first end and an opposed fiber second end, said fiber being provided with a wavelength filter optically coupled thereto between said fiber first and second ends; said wavelength filter defining a temperature dependent center wavelength and a rate of wavelength drift per temperature change; said optical fiber being attachable about a fiber first

attachment point and a fiber second attachment point to said packaging structure, said fiber first and second fiber points being positionable respectively between said fiber first end and said wavelength filter and between said fiber second end and said wavelength filter; said packaging structure comprising:

- a housing having a generally hollow housing body, said housing body defining a housing body first end and a substantially opposed housing body second end;
- a fiber-to-housing attachment means for attaching said fiber to said housing so that said wavelength filter is substantially protectively positioned within said housing body;
- a center wavelength adjustment means for allowing adjustment of said center wavelength;
- an independent wavelength excursion adjustment means for allowing adjustment of said rate of wavelength drift per temperature change independently from the adjustment of said center wavelength.

39. A packaging structure as recited in claim 38 wherein said center wavelength adjustment means includes a fiber tension adjustment means for allowing adjustment of the tension imparted on said wavelength when said fiber is attached to said housing.

40. A packaging structure as recited in claim 38 wherein said wavelength excursion adjustment means includes an attachment point spacing adjustment means for allowing adjustment of the spacing between said fiber first and second adjustment points.

41. A packaging structure as recited in claim 38 wherein

- said center wavelength adjustment means includes a fiber tension adjustment means for allowing adjustment of the tension imparted on said wavelength filter when said fiber is attached to said housing;

- said wavelength excursion adjustment means includes an independent attachment point spacing adjustment means for allowing adjustment of the spacing between said fiber first and second adjustment points independently from the adjustment of the tension imparted on said wavelength when said fiber is attached to said housing.